

**WOODARD & CURRAN**  
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CORPORATE OFFICES: Maine, Massachusetts,  
New Hampshire, New York, Connecticut, Florida  
*Operational offices throughout the U.S.*

August 2, 2006

U.S. Environmental Protection Agency  
Water Technical Unit  
P.O. Box 8127  
Boston, Massachusetts 02114

AUG - 3 2006

Re: **NPDES Phase II Small MS4 General Permit Annual Report for Salem, MA**  
EPA NPDES Permit No.: MA041219  
MaDEP Transmittal No.: W-040844

To Whom It May Concern:

On behalf of the City of Salem, Massachusetts, please find enclosed the Annual Report that summarizes the stormwater best management practices implemented during Year 3 (March 2005 to March 2006) under the above referenced permit.

Should you have any questions, please contact Bruce Thibodeau, Salem's City Engineer at (978) 745-9595 ext. 321, or me at 978.557.8150.

Sincerely,  
WOODARD & CURRAN INC.

Emily Scerbo  
Engineer

EJS/ejs  
210134

Enclosure: Permit Year 3 Annual Report

cc: Thelma Murphy, Storm Water Coordinator, U.S. EPA Region 1  
MADEP

**Municipality/Organization:** City of Salem, Massachusetts

**EPA NPDES Permit Number:** MA041219

**MaDEP Transmittal Number:** W-040844

**Annual Report Number**

**& Reporting Period:** No. 3: March 2005-March 2006

## NPDES PII Small MS4 General Permit Annual Report

### Part I. General Information

**Contact Person:** Bruce Thibodeau

**Title:** City Engineer

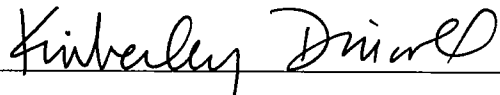
**Telephone #:** (978) 745-9595 ext. 321

**Email:** BruceThibodeau@Salem.com

#### Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

**Signature:**



**Printed Name:** Kimberley Driscoll

**Title:** Mayor

**Date:**

7/31/06

## **Part II. Self-Assessment**

The City of Salem, Massachusetts has completed the required self-assessment and has determined that our municipality is in compliance with all permit conditions. At this time, all of the BMPs selected in the 2003 Notice of Intent continue to be appropriate. City does not wish to subtract or replace any of the BMPs. There are some additional BMPs reported for Permit Year 3 to reflect unplanned stormwater activities by the City and Salem Sound Coastwatch.

## Part III. Summary of Minimum Control Measures

### 1. Public Education and Outreach

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 3 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 4
1	Website	Dept. of Public Services (through the efforts of Salem Sound Coastwatch (SSCW))	Maintain and update website (provided funding is available).	Maintained and updated SSCW website with volunteering opportunities and results of water quality monitoring in the Salem	Continue to maintain and update website (provided funding is available).
Revised					
2	Informational brochures	Dept. of Public Services (through the efforts of SSCW)	Provide and maintain brochures at SSCW office. Distribute brochures at public events (provided funding is available).	Provided and maintained brochures at SSCW office, and distributed brochures at public events including the SSCW Annual Meeting held on November 3, 2005. Brochures are also made available at the City offices on the 4 <sup>th</sup> floor at 120 Washington Street.	Continue to provide and maintain brochures at SSCW office and to distribute brochures at public events (provided funding is available).
Revised					
3	Newsletter	Dept. of Public Services (through the efforts of SSCW)	Provide and maintain newsletters at SSCW office. Mail newsletters to dues paying SSCW members and others on a quarterly basis (provided funding is available).	Provided and maintained newsletter, <i>Salem Sound Monitor</i> , which is distributed quarterly.	Continue to provide and maintain newsletter at SSCW office and to distribute newsletter (provided funding is available).
Revised					

4	Public event displays	Dept. of Public Services (through the efforts of SSCW)	Post display annually at the Maritime Festival, and other public events if possible (provided funding is available).	A display was posted at the annual Maritime Festival held on July 16 & 17, 2005 at Derby Warf.	Continue to post display annually at the Maritime Festival, if possible (provided funding is available).  SSCW, in conjunction with the Massachusetts Bays Estuary Association (MBEA) plans to display 15-foot tall Stormy the Duck at the Swim n' Fin Festival in July 2006 at Forest River Park. Stormy is the mascot for the <i>Think Again. Think Blue.</i> campaign.
Revised					
5	Local newspaper articles	Dept. of Public Services (through the efforts of SSCW)	One article per year.	SSCW did not submit an article this year on the topic of stormwater and nonpoint source pollution.	Plan to write one newspaper article or press release related to Salem's stormwater program.
Revised					
6	Training of volunteers	Dept. of Public Services (through the efforts of SSCW)	Annually (provided funding is available).	The Clean Beaches and Streams Orientation and Training was conducted by SSCW staff on May 5, 2005. Volunteers were trained to collect water quality samples throughout the 2005 swimming season.	Continue annual training of volunteers (provided funding is available).
Revised					
7	Publish results of water quality monitoring	Dept. of Public Services (through the efforts of SSCW)	Year 1 – Publish upon receipt of results; Years 2 through 5 – Continue based on available funding.	Results of water quality monitoring performed during Permit Year 3 are published on SSCW's website ( <a href="http://www.salemsound.org">www.salemsound.org</a> ).	Continue to publish results (provided funding is available for sampling).
Revised		and Board of Health		Results of BOH beach water quality monitoring are published on the MA DPH website.	

**1a. Additions**

31	North River Awareness Week	Dept. of Public Services (through the efforts of SSCW)	SSCW will sponsor the North River Awareness Week annually (provided funding is available) and discuss stormwater impacts on the river	The 4 <sup>th</sup> Annual SSCW North River Awareness Week was from May 6 through 13, 2006. On May 11, SSCW led the North River Awareness walk along the banks of the river and presented an overview of key environmental issues.	Continue the annual North River Awareness week (provided funding is available) and include stormwater as a discussion topic.
32	Low Impact Development (LID) Outreach	Dept. of Public Services (through the efforts of SSCW)	Year 3 – SSCW Speakers Series will focus on LID Year 4 & 5 – Continue to promote LID techniques for stormwater management	On October 18, SSCW sponsored a Low Impact Development Forum as part of their SSCW Speakers Series. This forum was advertised to residents, developers, and designers on the North Shore and was held at Peabody Institute Library in Danvers.	The City plans to offer rain barrels at a reduced cost to Salem residents for water conservation and to reduce stormwater runoff.  Begin outreach for the Stormwater & LID Ordinance.

## 2. Public Involvement and Participation

<b>BMP ID #</b>	<b>BMP Description</b>	<b>Responsible Dept./Person Name</b>	<b>Measurable Goal(s)</b>	<b>Progress on Goal(s) – Permit Year 3 (Reliance on non-municipal partners indicated, if any)</b>	<b>Planned Activities – Permit Year 4</b>
8	Water quality monitoring program	Dept. of Public Services (through the efforts of SSCW)	Annually (provided funding is available).	Under SSCW's Clean Beaches and Streams Program, trained volunteers collected samples from prioritized sites and performed testing every two weeks during summer 2005.	Continue program (provided funding is available).
Revised					
9	Beach cleanup program	Dept. of public Services (through the efforts of SSCW)	Conduct once per year, each summer (provided funding is available).	Under SSCW's Beach Buddies / COASTSWEEP Program, volunteers removed marine debris and trash from coastal recreation areas on September 24, 2005.	Coastsweep scheduled for September 2006.
Revised					
10	Storm drain stenciling	Dept. of Public Services (through the efforts of SSCW); Salem State College (through the efforts of MA Community Water Watch)	Evaluate once per year. Perform stenciling (provided funding is available).	The Salem Academy Charter School partnered with SSCW for a service learning project to promote environmental awareness in Salem. They performed storm drain stenciling in November 2005.	The Salem Academy Charter School plans to continue this stenciling effort in the Spring of 2006.
Revised					
30	Coastal Habitat Invasives Monitoring Program	Dept. of Public Services (through the efforts of SSCW)	Annually (provided funding is available).	Under SSCW's Coastal Habitat Invasives Monitoring Program, trained volunteers collected information on location and amount of invasive species.	Continue program (provided funding is available).
Revised					

**2a. Additions**

33	North River Clean-up	Dept. of Public Services (through the efforts of SSCW)	Year 3 – Remove trash and other debris from the river and banks.	<p>On April 16, 2005, the MA Community Water Watch sponsored a North River Clean-up for Earth Day. Trash and debris was collected from several sites along the river.</p> <p>On September 10, 2005, SSCW sponsored a North River Clean-up for volunteers in Salem and Peabody. Trash and debris was collected along Harmony Grove and from the river where the rainbow smelt spawn in the Spring.</p>	No activities are planned for Permit Year 4 at this time.
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### 3. Illicit Discharge Detection and Elimination

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 3 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 4
11	Develop GIS database of the drainage system	Dept. of Public Services	Pending EOE A funding approval, begin digital mapping	There were no planned activities for Permit Year 3.	Review the GIS database and update.
Revised					
12	Salem Sound Shoreline Survey (Project No. 2002-01/604)	Health Dept.	Obtain copies of the quarterly progress reports, as well as other information pertinent to Salem	The Shoreline Survey is complete. The City received a copy of the final report.	No action is planned for Permit Year 4.
Revised					
13	Visually inspect outfalls for dry weather flows	Dept. of Public Services (through the efforts of SSCW)	Inspect a representative number of outfalls annually (provided funding is available).	Performed visual inspection of a representative number of outfalls during dry weather period.	Continue to inspect a representative number of outfalls annually (provided funding is available).
Revised					
14	Conduct water quality sampling at stormwater outfalls.	Dept. of Public Services (through the efforts of SSCW)	Year 1 – Publish results of sampling. Years 2 through 5 – Perform additional sampling (provided funding is available).	SSCW performed sampling every two weeks at various outfalls during the 2005 swimming season. Results are published on SSCW's website ( <a href="http://www.salemsound.org">www.salemsound.org</a> ) and are attached.	Perform additional sampling and publish results (provided funding is available).
Revised					
15	Conduct water quality sampling at beaches	Health Dept.	Perform weekly beach sampling during summer months in accordance with DEP criteria	Weekly beach sampling was performed at 18 locations during the period from June 22 to Aug 10, 2005. Naumkeag Beach was also sampled through July 6, 2005. Results are attached and published on the MA DPH website.	Continue to perform weekly sampling during summer months in accordance with DEP criteria.
Revised					

16	Develop Stormwater Ordinance	Dept. of Public Services	Year 1 – Review existing bylaws & regulations; Year 2 – Propose changes; Year 3 – Implement changes, subject to City approval	Upon review of Salem’s Code of Ordinances, Chapter 46, Division 3 – “Use of Public Sewers” prohibits non-stormwater discharges to any public sewer, which includes both the sanitary sewer and the storm sewer and includes enforcement provisions.	No further action is necessary to fulfill the requirements of the General Permit under this MCM.
Revised					
29	Perform study to identify contamination sources(s) [ <i>BMP added in Permit Year 2</i> ]	Dept. of Public Services	Year 1 – Submit grant application to MCZM; Year 2 – Initiate study (provide funding is available).	The City Engineer and Woodard & Curran presented the findings and recommendations of the Juniper Beach study and the Willows Park study to the City Council Committee on Public Health, Safety & Environment on July 13, 2005.	Install a “duckbill” tide gate on the Juniper Beach outfall pipe to mitigate suspected sources of pathogens. Use SSCW and BOH sampling data to monitor results.
Revised			<i>Year 3 to 5 – Implement Recommendations</i>	Woodard & Curran prepared a cost estimate for several options to mitigate nonpoint source pollution and potential illicit discharges to the Juniper Beach outfall.	Identify funding source to conduct public education at Willows Park to discourage bird/animal feeding and minimize pet waste.

#### 4. Construction Site Stormwater Runoff Control

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 3 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 4
17	Develop an ordinance requiring developers to prepare an Erosion & Sediment Control Plan for all sites disturbing more than 1-acre	Dept. of Public Services; Planning Board; Conservation Commission	Year 1 – Review existing bylaws and regulations; Year 2 – Propose changes; Year 3 – Implement changes, subject to City approval.	Between March 2005 and December 2005, the City developed a Stormwater and Low Impact Development (LID) Ordinance, Regulations, and the <i>Urban Stormwater Management Guidebook</i> to address the General Permit requirements under this MCM. These documents are available for download at <a href="http://www.woodardcurran.com/highlights_StormwaterOrdinance.asp">http://www.woodardcurran.com/highlights_StormwaterOrdinance.asp</a> or by request. This project was funded through the Massachusetts Office of Coastal Zone Management's Coastal Nonpoint Source Grant Program.	Hold a meeting with the new Mayor to discuss adopting this Ordinance.  Begin process of implementation, subject to Mayor and City Council approval.
Revised	<i>...disturbing one acre or greater</i>		<i>Year 3 – Develop Ordinance. Year 4&amp;5 - Implement changes, subject to City approval</i>		
18	Periodically check erosion control measures and construction material management on site inspections	Dept. of Public Services; Planning Board, Conservation commission	Monitor and track violations	Monitored sites to inspect erosion control measures and construction material management.	Continue to monitor and track violations.
Revised					

## 5. Post-Construction Stormwater Management in New Development and Redevelopment

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 3 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 4
19	Develop an ordinance requiring stormwater controls for all new and redevelopment projects disturbing more than 1-acre	Dept. of Public Services; Planning Board; Conservation Commission	Year 1 – Review existing bylaws & regulations; Year 2 – Propose changes; Year 3 – Implement changes, subject to City approval	Between March 2005 and December 2005, the City developed a Stormwater and Low Impact Development (LID) Ordinance, Regulations, and the <i>Urban Stormwater Management Guidebook</i> to address the General Permit requirements under this MCM. These documents are available for download at <a href="http://www.woodardcurran.com/highlights_StormwaterOrdinance.asp">http://www.woodardcurran.com/highlights_StormwaterOrdinance.asp</a> or by request. This project was funded through the Massachusetts Office of Coastal Zone Management's Coastal Nonpoint Source Grant Program.	Hold a meeting with the new Mayor to discuss adopting this Ordinance.  Begin process of implementation, subject to Mayor and City Council approval.
Revised	<i>...disturbing one acre or greater</i>		<i>Year 3 – Develop Ordinance. Year 4&amp;5 - Implement changes, subject to City approval</i>		

## 6. Pollution Prevention and Good Housekeeping in Municipal Operations

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 3 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 4
20	Street Sweeping	Dept. of Public Services	Sweep streets between April & November (provided funding is available)	Completed annual sweeping program.	Continue program (provided funding is available).
Revised					
21	Clean Sweep Program	Dept. of Public Services	Conduct sidewalk cleanup program each year for 1 week in May (provided funding is available).	Completed annual sweeping program.	Continue program (provided funding is available).
Revised					
22	Catch basin cleaning	Dept. of Public Services	Inspect problem areas annually, and clean as needed (provided funding is available)	Completed inspection of problem areas and performed catch basin cleaning as needed.	Continue annual inspection of problem areas and cleaning as needed (provided funding is available).
Revised					
23	Trash collection program	Health Dept.; Dept. of Public Services	Weekly curbside pickup (provided funding is available).	Completed weekly curbside trash collection program.	Continue program (provided funding is available).
Revised		Parks & Recreation		<i>With support from various volunteer groups, continue to pickup trash and empty trash receptacles at bus stops, in the downtown area, and at City parks, such as Willows Park, at varying frequency depending on park activity.</i>	
24	Recycling Program	Dept. of Public Services	Bi-weekly curbside pickup (provided funding is available).	Completed bi-weekly curbside recycling program.	Continue program (provided funding is available).
Revised					

25	Yard Waste Program	Dept. of Public Services	Curbside pickup several times per year (provided funding is available). Allow residents to drop off yard waste at City's transfer station year round.	Completed yard waste collection program.	Continue program (provided funding is available).
Revised					
26	Household hazardous waste program	Health Dept.	Hold twice over the 5-year permit term (provided funding is available).	The household hazardous waste program was not held this year.	Since one hazardous waste collection program occurred in June 2004, the next hazardous waste collection is scheduled for June 2007.
Revised					
27	Animal Control Program	Police Dept. Animal control Officer	Track the number of animals collected (provided funding is available).	Completed tracking of animals collected.	Continue program (provided funding is available).
Revised					
28	Beach Cleanup Program	Parks & Recreation	Clean Beaches every week between May and September (provided funding is available).	Beaches were cleaned several times during the spring and summer of 2005.	Continue to clean beaches in the spring and summer of each year (provided funding is available).
Revised					

#### 6a. Additions

34	Appliance Sticker Program for Curbside Pickup	Dept. of Public Services	Conduct curbside pickup of appliances twice per month (provided funding is available).	Salem residents are now able to purchase stickers for curbside collection of computer monitors, TVs, light ballasts and freon-based appliances such as air conditioners, dehumidifiers, and refrigerators. Items are collected on the second and fourth Saturday of each month.	Continue the Appliance Sticker Program.
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**7. BMPs for Meeting Total Maximum Daily Load (TMDL) Waste Load Allocations (WLA) Not Applicable** - None of Salem's receiving waters have approved TMDL reports at this time.

#### **Part IV. Summary of Information Collected and Analyzed**

A summary of water quality monitoring results is attached. The summary, prepared by Salem Sound Coastwatch, includes the results from monitoring by Salem Sound Coastwatch (BMP#14) and from the City of Salem Board of Health (BMP #15). During 2005, the following beach closings occurred:

- Collins Cove: July 6
- Juniper Point: July 6, July 14
- Mackey: July 6
- Ocean Avenue: June 22, July 6 through July 27
- Osgood: July 6
- Pickman Park: July 6, July 14 through July 27, August 10
- Willow Avenue: July 6
- Willows Pier: July 6

## Beach Bacteria Analysis 2005

Enterococci Standard of beach closure following sampling of 104 colonies per 100 ml of sample; or geometric mean of 35 colonies per 100 ml of the five most recent samples.

[illegible]



# SALEM SOUND COASTWATCH

*Protecting the Coastal Habitats of the Salem Sound Watershed with the Communities of Manchester, Beverly, Danvers, Peabody, Salem, and Marblehead.*



## Salem Sound Clean Beaches and Streams Program 2005 Report

The following report is a summary of results from water quality testing that has occurred over the past summer by Salem Sound Coastwatch's Clean Beaches and Streams Program and by Salem Sound municipalities. The data is displayed in tables and graphs below: Table 1. displays results of tests performed by Salem Sound Coastwatch (SSCW) at coastal outfall pipes and streams.



*US EPA National Water Quality Inventory reports runoff from urbanized areas is the leading source of water quality impairments to surveyed estuaries, harming fish and marine plants and animals, killing native vegetation, and making recreational areas unsafe and unpleasant.*

(EPA 841-F-03-003)

### Approach and Methods

While municipalities test bathing waters at public beaches, Salem Sound Coastwatch focuses on storm water outfall pipes and coastal streams, many of which are located on bathing beaches and near boating areas. SSCW's samples are collected at sites of stormwater discharge at low tide. As a result, bacterial counts tend to be higher than from samples taken from the water in the middle of a bathing beach. However, results from outfall pipes and streams indicate that contaminants are still making their way into our area waters.

EPA has concluded that *Enterococcus* is the best indicator organism in marine waters to show a correlation with adverse human health effects. Therefore, all states have been mandated to use this standard by April of 2004. During the 2003 transition year, SSCW tested for both fecal coliform and *Enterococcus*. In 2004 and 2005, all Salem Sound communities and SSCW used *Enterococcus* as the indicator organism for marine water testing.

The Salem Sound municipalities test bathing waters at least once a week during the swimming season, more frequently if *Enterococcus* levels were shown to be high. **Beaches are closed if a single test reports *Enterococcus* levels greater than 104 CFU/100mL or if the geometric mean of the most recent five (5) *Enterococcus* levels within the same bathing season exceeds 35 colonies per 100mL** (Massachusetts state sanitary code 105 CMR 445.000). This is a statistical averaging method used to even out the average when dealing with a wide range of numbers.

## Definition of Dry vs. Wet Conditions

Rain can cause temporary elevated bacterial counts at discharge sites and within nearshore coastal waters. Runoff from impervious surfaces (parking lots, roofs, streets) flushes contaminants through storm drains, bringing pollution onto the beaches and other coastal habitats.

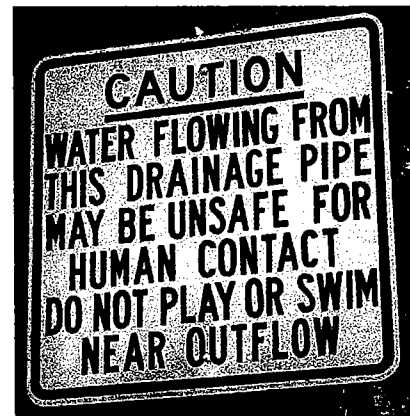
Salem Sound Coastwatch defines “dry” conditions vs. “wet” differently than the municipalities. Under SSCW’s definition, dry conditions are less than 0.2" precipitation the day of sampling or less than 0.5" within the three days preceding sampling. Wet conditions are defined as more than 0.2" precipitation on the day of sampling or more than .5" within three days preceding sampling. Protocols for wet weather sampling are the same as for dry weather sampling.

The municipalities define wet conditions, or a “storm” event, as any occurrence of precipitation during the sampling or within the 24 hours preceding the sampling.

## Salem Sound Coastwatch Test Results

Table 1. below shows the results of samples taken by Salem Sound Coastwatch over the course of the summer. Samples were taken every 2 weeks within two hours of low tide. All samples were tested by the US EPA New England Regional Laboratory (11 Technology Way, North Chelmsford, MA 01863), using EPA Region I method, A110: Entrolert and Quanti Tray method,.

Since there were too few samples to calculate a meaningful geometric mean, each test result is included in the table. Those values that are higher than EPA standards (EPA-823-R-03-008) are indicated in **bold**: *Enterococcus* >104 CFU/100mL and fecal coliform >200 CFU/100mL.



Samples were taken from May through September. Eight of the nine SSCW’s water quality testing dates took place during dry weather conditions. The one wet event took place on May 24<sup>th</sup>. Every site, except two, on this sampling date exceeded the standards set by EPA ( EPA-823-R-03-008), and test results ranged from 116 to 51,720 CFU/100mL for *Enterococcus*. See Table 1.0.



## For Additional Information

For additional information about Salem Sound Coastwatch’s Clean Beaches & Streams Program, including information on how you can get involved as a volunteer in this important, environmental monitoring program, please call Salem Sound Coastwatch at 978-741-7900 or email [barbara.warren@salemsound.org](mailto:barbara.warren@salemsound.org).

**Table 1. Salem Sound Coastwatch--water quality monitoring results  
2005 from outfall pipes and streams in the Salem Sound Watershed.**

			WET	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
<b>Marblehead</b>	<b>Site #</b>	<b>Test</b>	<b>5/24</b>	<b>6/7</b>	<b>6/21</b>	<b>7/5</b>	<b>7/26</b>	<b>8/9</b>	<b>8/23</b>	<b>9/6</b>	<b>9/20</b>
Stramski Beach - Stream draining across beach	722	Ent	364	75	293	195	960	1,038	6,932	ns	2,318
Stramski Way - Dodge Road drainage	722a	Ent	587	91	666	1,350	2,452	996	4,480	>9,678	4,813
Stramski Way - Pitman Street drainage	722b	Ent	1,664	nd	54	100	1,140	4	7,945	3,080	5,654
Doliber Cove Creek-Grace Oliver Beach	700	Ent	6,270	97	159	174	52	507	No flow	ns	ns
Riverhead Beach Culvert-facing on left	701A	Ent	933	124	265	ns	278	310	334	192	384
Riverhead Beach Culvert-facing on right	701B	Ent	953	81	281	ns	276	289	162	90	1,164
Preston Beach Culvert	800	Ent	ns	ns	21	100	ns	ns	ns	ns	ns
<b>Beverly</b>											
Dane St. Beach - western storm drain at beach	322	Ent	1,041	4	239	25	105	64	79	34	16
Dane St. Beach - Lawrence Street brook at beach	321	Ent	193	117	222	34	744	129	152	52	62
Rice Beach - stream outfall onto beach	214	Ent	373	54	ns	89	6,932	No flow	1,302	ns	No flow
Rice Beach - stream draining from under shed	214A	Ent	165	860	ns	44	774	2,190	5,199	ns	3,683
Brackenbury Beach - stream from 4' x 4' Culvert	213	Ent	116	344	167	168	420	250	518	179	287
Concrete culvert to the east (18"dia.)	213A	Ent	48	21	159	672	826	No flow	44	138	208
Storm drain 100 ft west of road	222	Ent	229	600	132	77	2,452	420	No flow	155	512
Wilson Street - beach seepage below steel upright	350s	Ent	ns	ns	nd	ns	ns	ns	ns	ns	ns
Kernwood Bridge - Beverly	352	Ent	ns	ns	nd	ns	12	115	54	820	ns
<b>Salem</b>											
North River - upstream of Rt. 114 overpass, Commercial St	537	Ent	2,460	229	2,318	839	>9,678	8,664	9,678	5,654	>9,678
North River - Commercial Way near foot bridge	559	Ent	38,730	21	127	30	263	507	826	352	5,654
Juniper Beach - storm drain on beach	620	Ent	4,100	198,630	81,640	8,390	30,760	4,814	14,210	126	>9,678
Palmer Cove - storm drain at Shetland Park	629	Ent	825	558	1,730	1,230	405	468	3,266	1,954	1,741
Derby Wharf - storm drain	630	Ent	32,700	510	475	744	1,549	9,678	2,747	395	471
Palmer Cove-storm drain below Playground	631	Ent	34	8	8	4	8	12	4,480	86	30
Willows Ave. Beach	642	Ent	51,720	215	3,300	6,240	373	>24,196	1,642	334	>9,678
<b>Manchester</b>											
Bennett's Brook (at Bennett Street)	149	Ent	ns	12	187	163	2,452	1,642	2,318	1,252	ns
Coolidge Point - Black Beach	151	Ent	140	48	105	54	5,654	606	2,747	120	587
<b>Danvers</b>											
Sandy Beach - outfall pipe	430	Ent	ns	ns	ns	ns	ns	147	ns	ns	ns
ENT = enterococci      Numbers in bold exceed standards specified by the EPA (EPA-823-R-03-008): ns = not sampled      Enterococcus > 104 CFU/100mL      nd = not detected											